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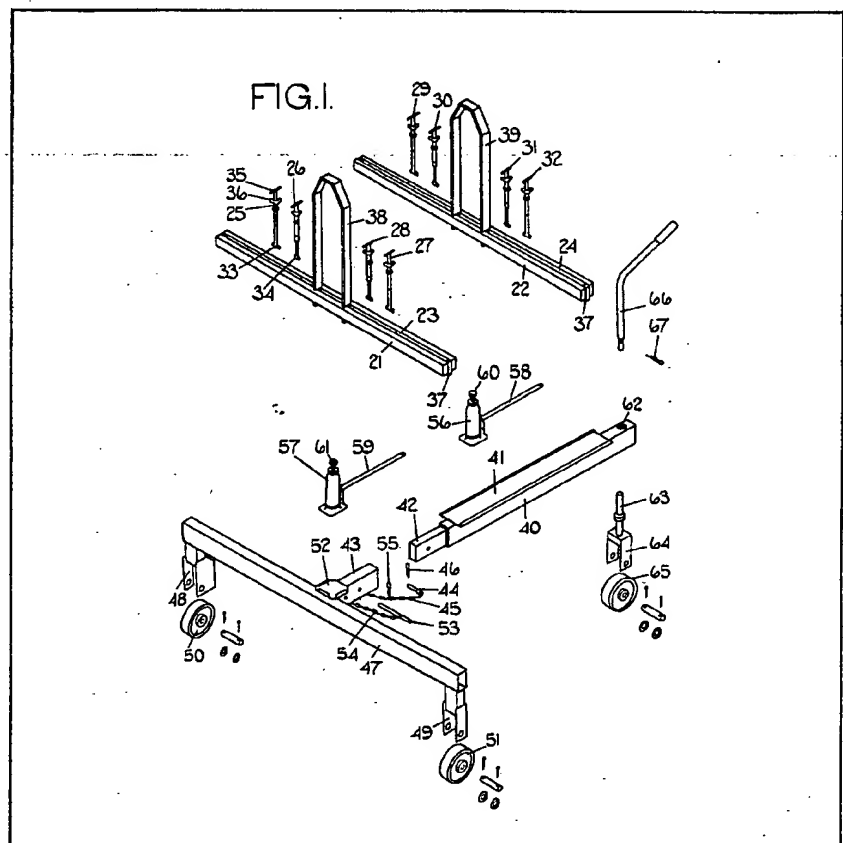
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## (54) Manhole cover lifting device

(57) A device for lifting and replacing manhole and inspection covers with at least four holes therein, comprising a T shaped support frame 40, 47 with wheels comprising a T shaped support frame 40, 47 with wheels 50, 51, 65, one of which may be connected to a handle 66 for steering the device, the frame carrying two spaced bars 21, 22 with adjustable members e.g. 25, 27, 29, 32 to engage in holes in the cover to be lifted, the bars having upstanding parts 38, 39 for engagement by respective jacks 56, 57 on the support frame 40, 47, the jacks being raised to lift the bars and the covers with them, the frame 40, 47 being movable on its wheels 50, 51, 65 to move the lifted cover away from the manhole or inspection hole.



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FIG. 1.

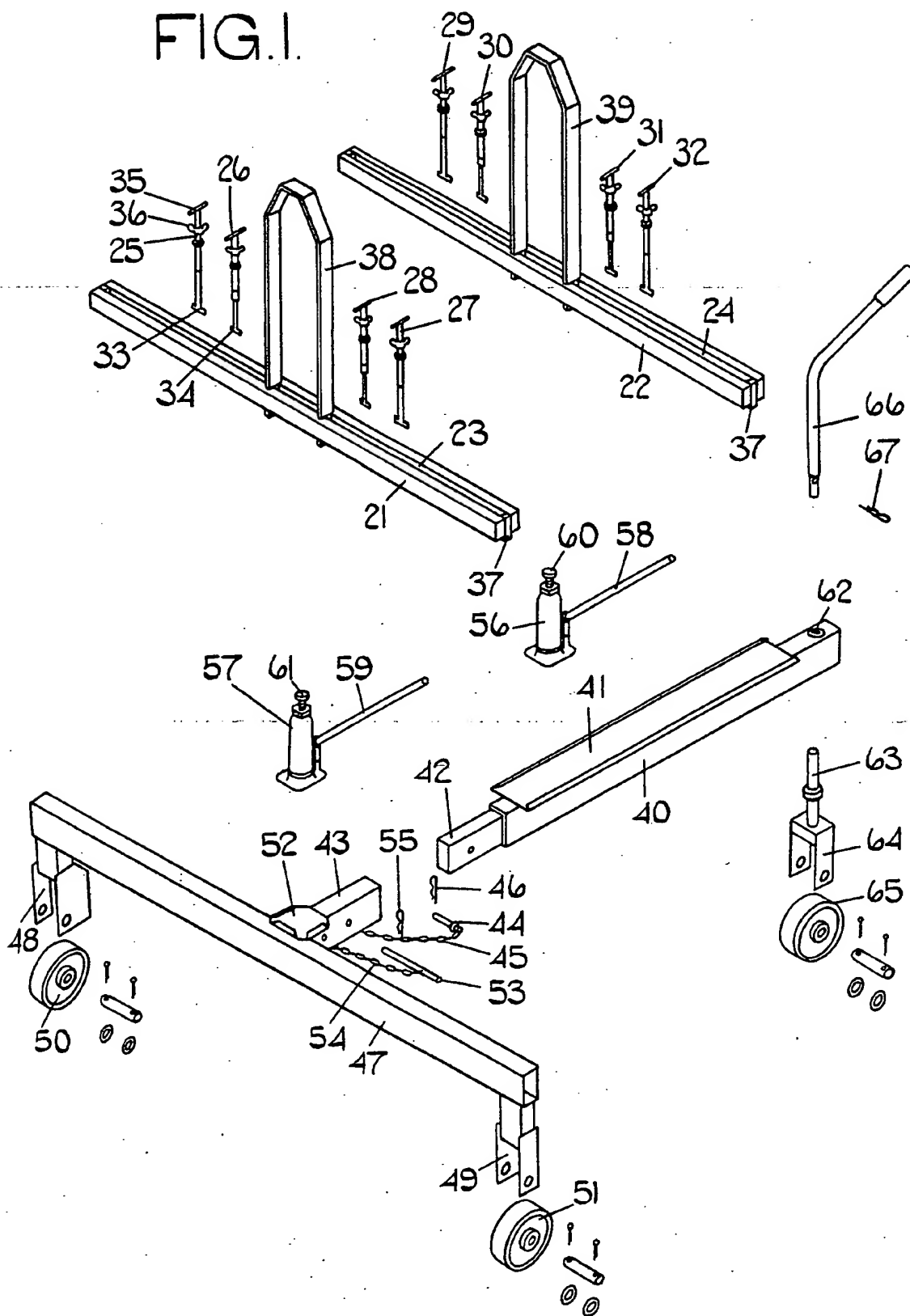


FIG.2.

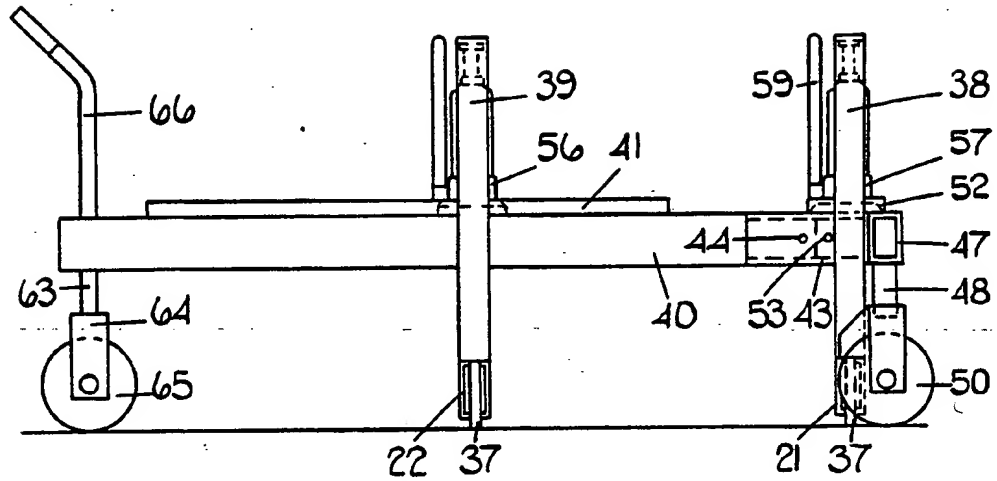


FIG.3.

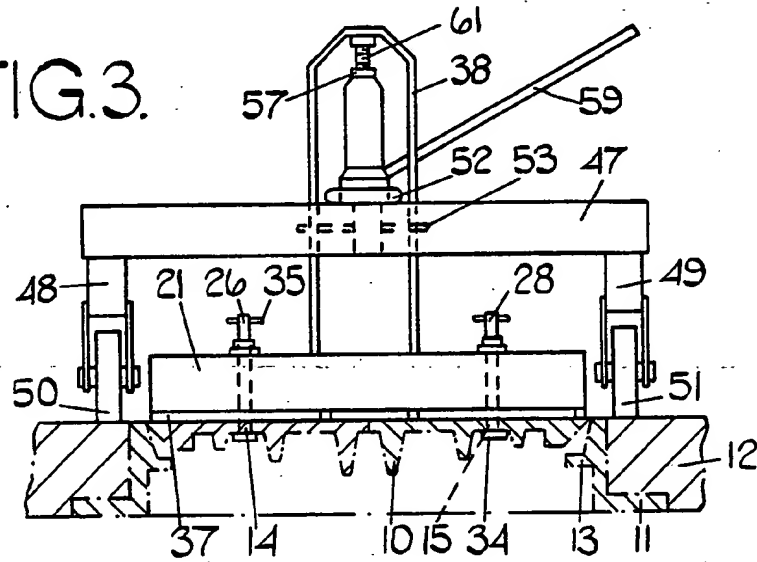
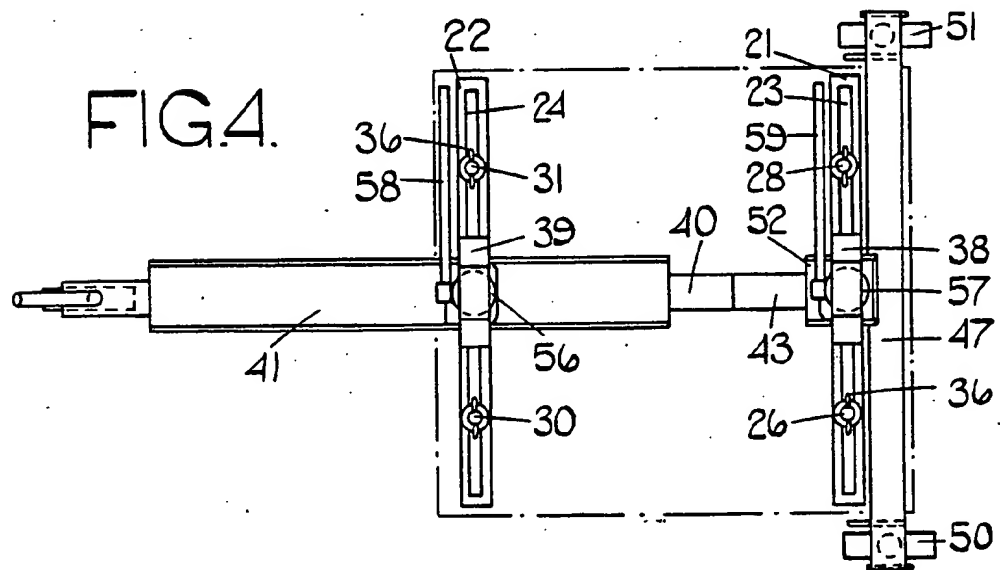


FIG.4.



## SPECIFICATION

### Manhole cover lifting device

5 This invention concerns devices for lifting and replacing manhole and inspection covers.

Manhole and inspection covers are provided with holes to accept lifting tools. Though there are others, the most usual arrangement is the provision of two  
10 or more spaced holes of keyhole or double ended keyhole shape. The tools commonly used for lifting merely have a handle and a shaped end, to pass through a hole, which, upon rotation through 90°, will not lift out again. On large covers there are at  
15 least four holes and the use of such tools usually requires two or four men. Since the covers are heavy, and must be lifted evenly without tilting, this can be quite difficult to achieve.

There are however available, various devices  
20 which have members arranged to engage in the respective holes, and means affording some mechanical advantage and these devices are sometimes mounted on tracks or other arrangement to allow the lifted cover to be moved away from the manhole.

25 One problem which has to be overcome is that the spacing of the holes differs, often substantially, from one cover to another.

Known devices of this kind are cumbersome and in some cases complicated and are expensive to  
30 manufacture.

It is the object of the invention therefore to provide a manhole and inspection cover lifting and replacing device which is simple and effective to use, requiring minimum operator effort, and which is inexpensive  
35 to manufacture.

According to the invention, a device for lifting and replacing manhole and inspection covers with at least four holes therein, comprises, in combination a support frame carrying two space bars, in each of  
40 which are adjustably mounted two members for engagement in respective holes in a manhole or inspection cover to be lifted, the bars being provided with respective upstanding parts arranged to engage on the top of respective lifting jacks, the jacks being  
45 mounted on the support frame which has ground engaging wheels, the arrangement being such that the bars are, in use, lowered onto the cover to be lifted, the members being engaged in respective holes in the cover, the jacks are operated to lift the  
50 bars and the cover with them, the frame being movable on its wheels to move the cover away from the manhole or inspection hole.

The invention will now be described, by way of example, with reference to the accompanying drawings, in which:-

*Figure 1* is an exploded perspective view of a device for lifting and replacing manhole and inspection covers constructed in accordance with the invention,

60 *Figure 2* is a side elevation view thereof,

*Figure 3* is a front elevation view, and

*Figure 4* is a plan view.

The device is for use in lifting manhole and inspection covers and *Figure 3* shows such a cover  
65 fitted into a support structure 11 in a roadway 12.

The device for removing the cover comprises a main longitudinal beam 40 carrying two spaced parallel bars 21, 22 extending at right angles to the length of the main beam. Each bar 21, 22 is formed  
70 from two channel section members mounted with their bases extending vertically. In each bar the channel section members are spaced apart and define between their flanges a closed ended slot 23, 24 extending throughout the length of the bar.

75 In each slot 23, 24 members 25 to 32 are slidably engaged. In use two such members are fitted in each bar, at either side of the centre.

*Figure 1* shows four for each bar but these represent two alternative sizes. Each such member is  
80 a threaded bar of circular cross-section with a short flat blade 33 or 34 (of alternative length) formed at its lower end. The upper end of each bar 25 to 32 carries a short transverse rod 35 whereby the rod can be turned. A lock nut 36 is provided on each of the bars.

Each of the four holes 14, 15 in the manhole or inspection cover 10 are parallel sided slots provided with a central part-circular enlargement so as to present a double ended keyhole shape. The shape of  
85 each hole corresponds with the combined shape of the blade 33 or 34 and of the threaded bars so that the members 25 to 32, as appropriate, can be passed into the holes when the blades 33 or 34 are correctly aligned. Having been inserted, these bars 25 to 32  
90 are rotated through 90° using the short rods 35 for the purpose, and in this position, cannot be withdrawn from the holes in the manhole or inspection cover 10. The lock nuts 36 are used to bring the bars 21 and 22 into tight engagement with the manhole or inspection cover. Projections 37 formed at the ends  
95 of the bars 21 and 22 extending from the underneath surfaces come into engagement with the manhole or inspection cover 10 as shown in *Figure 3*. These are provided to ensure that the bars 21, 22 are held firmly with respect to the manhole or inspection cover 10.  
100

Fixedly mounted in the centre of each of the bars 21, 22 are respective upstanding stirrups 38, 39. The stirrups 38, 39 straddle the main beam of the device.

The main beam is formed from rectangular section  
110 tube and comprises a part 40 to the upper surface of which is fixed a plate 41 with inwardly inclined lateral flanges. In one end of the part 40 is secured a smaller section rectangular tube section 42 which is releasably fixed in a rectangular section socket  
115 portion 43. To hold the tube section 42 in the socket portion 43 a pin 44 passes through alignable holes in the section and socket portion respectively. The pin 44 is connected by a chain 45 to the socket portion 43 and is retained in place by a spring clip 46.

120 The socket portion 43 is fixed to the centre of a transverse beam 47 of rectangular tube. To the outer ends of this are fixed wheel forks 48, 49 to which are journaled respective non-steerable wheels 50, 51. Guard plates are fixed to the forks adjacent to the  
125 wheels. On the junction of the socket portion 43 and the transverse beam 47 is fixed a plate 52 of generally square shape and having, on three sides, inwardly inclined flanges. The side of this plate presented in the direction of the length of the socket  
130 portion is unflanged.

The stirrup 38 is located over the socket portion 43 and is prevented from swinging by a stabilising pin 53 located in a hole in the socket portion and of a length to extend out beyond both sides of that portion. The stabilising pin 53 is retained by a chain 54 to the socket portion 43 and is held in place by a spring clip 55.

Mounted on the plates 41 and 52 are respective removable hydraulic jacks 56, 57 of which the operating handles 58, 59 extend laterally of the main beam of the device. The foot of each jack is located by the inclined flanges of the plates 41 and 52, the position of the jack 56 being capable of adjustment along the plate 41 to any desired position in accordance with the spacing of the holes in the manhole or inspection cover.

The jacks have respective rams 60, 61 arranged to engage the undersides of stirrups 38, 39 respectively. The jack rams have cups into which is engaged a projection on the underside of the stirrups 38, 39.

The end of the main beam part 40 remote from the tube section 42 has a vertical hole 62 to accept a tube 63. To the lower end of the tube 63 are fixed wheel forks 64 for a wheel 65. Into the upper end of the tube 62 fits a handle 66 which is cranked to facilitate manoeuvre of the device. To hold the handle firmly in the tube 63 a spring clip 67 is used. This arrangement allows the wheel 65 to be steered by means of the handle 66. The wheels 50, 51 and 65 support the device so that the main beam and the transverse beam, as well as the bars 21, 22 are in horizontal positions.

When the device is in use, with the bars 21, 22 secured to a manhole or inspection cover, as shown in Figure 3, the manhole or inspection cover can be raised perpendicularly out of its supporting structure 11 by simultaneous actuation of the two jacks 56, 57. Once raised to a position to above the level of the edge of the support structure 11, an operator can move the whole device with the manhole or inspection cover attached to it away from the hole. The handle 66 is used for this and also provides steering for the wheel 65. The width between the wheels 50, 51 is sufficient to clear the edges of the hole. The device may be moved forward or back and can be easily moved to any desired position.

To replace the cover the reverse procedure is carried out. Once the manhole or inspection cover has been aligned over the hole, it is lowered into the ground by means of the two jacks 56, 57. The threaded bars 25 to 32 are then released from the holes 14, 15 in the cover 10. The device may now be removed from the vicinity of the manhole or inspection cover.

The device can be readily dismantled for transportation and takes up relatively small space when so dismantled. The jacks 56, 57 are removable from their mounting plates 41, 52. By releasing the pin 44 the main beam can be separated from the transverse beam 47. By removing the stabilising pin 53, the stirrup 38 with its bar 21 can be released from the socket portion 43. Also the stirrup 39 with its bar 22 can be released from over the main beam. Removal of the spring clip 67 allows the handle 66 and wheel 65, with its tube 63 to be removed from the part 40 of

the main beam.

The form of the members 25 to 32 and of the bars 21, 22 may be changed to suit manhole inspection covers with different access holes or other formations. However, adjustment of the members 25 to 32 in the slots in the bars 21, 22 allows a large number of the standard manhole or inspection covers in use, to be lifted by means of this device.

## 75 CLAIMS

1. A device for lifting and replacing manhole and inspection covers with at least four holes comprising, in combination a support frame carrying two spaced bars, in each of which are adjustably mounted two members for engagement in respective holes in a manhole or inspection cover to be lifted, the bars being provided with respective upstanding parts arranged to engage on the top of respective lifting jacks, the jack being mounted on the support frame which has ground engaging wheels, the arrangement being such that the bars are, in use, lowered onto the cover to be lifted, the members being engaged in respective holes in the cover, the jacks are operated to lift the bars and the cover with them, the frame being movable on its wheels to move the cover away from the manhole or inspection hole.

2. A device as claimed in claim 1 in which each of the bars is slotted lengthwise to permit adjustment of the members therein and the members are themselves adjustable in height.

3. A device as claimed in claim 1 or claim 2 in which the support frame has three wheels and a handle adjacent to one of the wheels, said handle being connected to a pivot for said wheel, whereby the device can be steered.

4. A device as claimed in claim 3 in which two wheels are carried at the opposite ends of a straight beam and the third wheel is carried, through said pivot, at the end of a main beam extending a right angles to the beam having the two wheels, the jacks being carried on the said main beam.

5. A device as claimed in claim 4 in which one of the jacks is adjustably mounted on said main beam, for adjustment lengthwise thereof.

6. A device as claimed in any one of the preceding claims in which said bars, jacks and said support frame are separable for transport and storage.

7. A device as claimed in claim 6 in which the support frame is dismantlable for transport and storage.

8. A device for lifting and replacing manhole and inspection covers with at least four holes, substantially as hereinbefore described with reference to and as shown in the accompanying drawings.